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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Anthony Haynes

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EXAMINER

TAKEUCHI, YOSHITOSHI

ART UNIT

PAPER NUMBER

4162

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/563,920	<b>Applicant(s)</b> HAYNES ET AL.	
	<b>Examiner</b> YOSHITOSHI TAKEUCHI	<b>Art Unit</b> 4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>Jan 10, 2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 30, 31, 36, 37, 41 and 42 are objected to because of the following informalities: brackets around the range are improper. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for lack of antecedent basis. The claim recites "the production of acetic acid" without sufficient antecedent basis. Also, a connector, such as "and," is required before the phrase, "optionally at least one of."
4. Claims 30, 36, and 41 are as being indefinite for lack of antecedent basis for the limitations "the molar ratio" and "the range." There is insufficient antecedent basis for this limitation in the claims.
5. Claims 31, 37, 42, 47 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. A claim limitation cannot be defined as "such as." In examining the instant application, the examiner did not give any weight to the language modified by the "such as" clause.
6. Claims 39 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

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regards as the invention. A claim limitation cannot be defined using “and/or.” The use of “and” in conjunction with “or” is inherently capable of having two or more meanings, so is ambiguous. In examining the instant application, the examiner interpreted “and/or” to mean “or.”

7. Claims 46 and 48 are objected to because they recite the limitations “the concentration” and “the range.” There is insufficient antecedent basis for this limitation in the claims.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 25, 43, 44, 45, 46, 47, 48, 49, 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Baker et al (EP 0752406). Baker teaches a method of producing acetic acid by carbonylation.

Regarding claim 25, Baker teaches a catalyst system for the production of acetic acid with a catalyst system comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, and indium and acetic acid, a non-hydrohalogenoic acid promoter (Page 1, line 23-27).

Regarding claim 43 and 44, Baker teaches a catalyst according to claim 25 which comprises at least one of ruthenium, osmium, rhenium, zinc, gallium, tungsten, cadmium, mercury and indium. (Page 3, lines 46-48).

Regarding claim 45, Baker teaches a process according to claim 25 for the production of acetic acid by reacting carbon monoxide with methanol or a reactive derivative thereof in a liquid reaction composition comprising methyl acetate, a finite concentration of water, acetic acid and a catalyst system comprising a catalyst system. (Page 2, lines 23-31).

Regarding claim 46 and 47, Baker teaches a process wherein the concentration of methyl acetate in the liquid reaction composition is in the range 1 to 35% by weight ( $C_F$  the claimed 1-70% and 2-50% by weight). (Page 2, line 30).

Regarding claim 48 and 49, Baker teaches a process wherein the concentration of water in the liquid reaction composition is less than 6.5% by weight. (Page 2, lines 29-30).

Regarding claim 50, Baker teaches a process according to claim 45 wherein the process is carried out as a continuous process. (Page 2, line 24).

10. Claims 25, 26, 27, 28, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Bruner, Jr. et al (US 5,710,325). Bruner teaches a catalyst system comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, and an oxoacid promoter, such as phosphoric acid. (Column 2, lines 34-36, 42-46 and column 5, lines 26-27, 52).

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole

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would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruner, Jr. et al (US 5,710,325). Bruner teaches a catalyst system comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, and a strong non-hydrohalogenoic acid promoter, such as phosphoric acid (column 2, lines 34-36, 42-46 and column 5, lines 26-27, 52), but does not specifically teach a molar ratio of the oxoacid anion to the iridium. Bruner teaches that the acid promoter accelerates both carboxylation reactions and the reaction of pentenoic acid to valerolactone. (Column 4, lines 30-35). Therefore it would have been obvious to one skilled in the art at the time of the invention to adjust the amount of acid promoter added to obtain the desired reaction speed. Furthermore, “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454 (CCPA 1955). It would have been obvious to one skilled in the art at the time of the invention to optimize the carbonylation reaction by using the most effective molar ratios of the catalyst to the promoter.

13. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruner, Jr. et al (US 5,710,325) in view of Wegman et al (US 6,521,783). Bruner teaches the use of a strong acid (column 2, lines 42-47) but does not give additional acids that may be used as the promoter. Wegman teaches a similar process for making acetic acid (column 1, lines 27-47) and teaches strong acids, which are useful for accelerating the reaction (column 2, lines 20-22, 24-26). It would have been obvious to one skilled in the art at the time of the invention to use an acid taught by Wegman in the system taught by Bruner as Wegman clearly teaches a similar

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reaction process to that of Bruner and both teach the use of strong acids for the purpose of accelerating the reaction.

14. Claims 25, 26, 32, 33, 36, 37, 38, 39, 40, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wegman et al (US 6,521,783).

Regarding claims 25, 26, 32, 33, 38, 39 and 40, Wegman teaches a catalyst system comprising an iridium carbonylation catalyst (column 40, line 6) and a super acid promoter (column 35 lines 63-64) or heteropolyacid promoter, such as molybdosilicates and tungstosilicates promoter (column 40, lines 31-35). Wegman teaches the creation of acetic acid without methyl iodide. However, it is well known that methyl iodide works as a catalyst with iridium in the synthesis of acetic acid and methyl iodide was disaffirmed in the Wegman patent for economic reasons, not for chemical incompatibility reasons. Wegman teaches that “methyl iodide is not required...thus providing substantial economic benefits in the design of equipment to carry out the processes.” (emphasis added) (Column 36, lines 35-39). The fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some technological incompatibility. In re Farrenkopf, 713 F.2d 714 (Fed. Cir. 1983). As a result, it would have been obvious to one skilled in the art at the time of the invention to synthesize acetic acid using an iridium catalyst, methyl iodide as a co-catalyst, and either a superacid or heteropolyacid, such as molybdosilicates and tungstosilicates.

Regarding claims 36, 37, 41 and 42, Wegman teaches a catalyst system comprising an iridium carbonylation catalyst (column 40, line 6) and a super acid

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promoter (column 35 lines 63-64) or heteropolyacid promoter, such as molybdosilicates and tungstosilicates promoter (column 40, lines 31-35). Wegman does not teach the use of methyl iodide (see above) or molar ratios of the acid to the iridium catalyst. However, “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454 (CCPA 1955). It would have been obvious to one skilled in the art at the time of the invention to optimize the carbonylation reaction by using the most effective molar ratios of the catalyst to the promoter.

15. Claims 32, 33, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruner, Jr. et al (US 5,710,325) in view of Pesa et al (US 4,469,886). Bruner teaches a catalyst system comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, and a strong non-hydrohalogenoic acid promoter, such as phosphoric acid (column 2, lines 34-36, 42-46 and column 5, lines 26-27, 52), but does not specifically teach a HBF<sub>4</sub>, HPF<sub>6</sub>, (CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>NH, or HCBH<sub>6</sub>Br<sub>6</sub> as a promoter in conjunction with an iridium catalyst and methyl iodide co-catalyst. Pesa teaches a process for hydrocarboxylation of propylene to produce isobutyric acid in the presence of a catalyst (abstract) and a strong acid, such as H<sub>2</sub>SO<sub>4</sub>, H<sub>3</sub>PO<sub>4</sub> and HBF<sub>4</sub>, as a complexing acid (column 5, lines 57-60). In promoting the reaction in Pesa, the H<sub>2</sub>SO<sub>4</sub>, H<sub>3</sub>PO<sub>4</sub> and HBF<sub>4</sub> are treated as being equivalent. Bruner teaches the use of phosphoric acid as a non-hydrohalogenoic acid promoter, and Pesa teaches that HBF<sub>4</sub> is equivalent to phosphoric acid. As a result, it would have been obvious to one skilled in the art at the time of the invention to treat HBF<sub>4</sub> and phosphoric acid as equivalent and substitute HBF<sub>4</sub> in the use of the Bruner prior art.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yoshitoshi Takeuchi/

/Jennifer McNeil/  
Supervisory Patent Examiner, Art Unit 4162